WL2863E

Ultra-Low Noise, High PSRR LDO, 250mA Linear Regulator for RF and Analog Circuits

http://www.omnivision-group.com

Descriptions

The WL2863E is a linear regulator capable of supplying 250-mA output current. Designed to meet the requirements of RF and analog circuits, the WL2863E device provides low noise, high PSRR, low quiescent current and very good load /line transients.

The device is designed to work with a 1μF input and 1μF output ceramic capacitor (no separate noise Operation bypass capacitor is required).

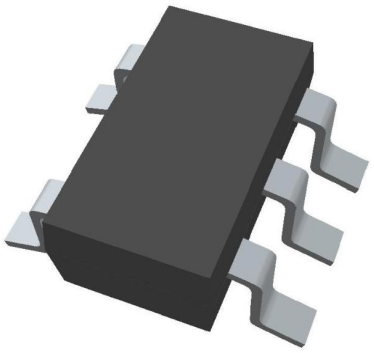
The WL2863E regulators are available in standard SOT-23-5L Package. Standard products are Pb-free and Halogen-free.

Features

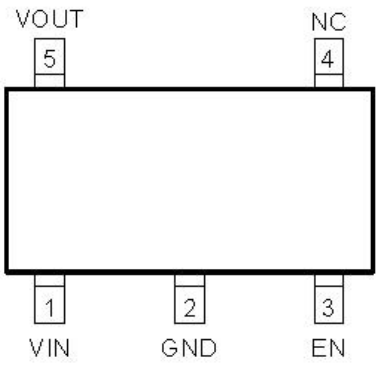
- Input Voltage Range :2.2V~5.5V
- Output Voltage Range :1.2V~4.3V
- Output current :250mA
- PSRR :Typ.100dB at 10mA，f =1KHz
  :Typ. 45dB at 10mA , f =1MHz
- Low Dropout :Typ. 115mV at 250mA
- Quiescent current :Typ. 21μA
- Low Output Voltage Noise :Typ. 7μVRMS
- Output Voltage Tolerance :±2%
- Shutdown Current :Typ. 0.01μA
- UVLO Threshold(V) :Typ. 1.90V
- Recommend capacitor :1uF
- Stable with 1μF Ceramic Input and Output capacitor
- No Noise Bypass Capacitor Required
- Thermal-Overload Protection

Applications

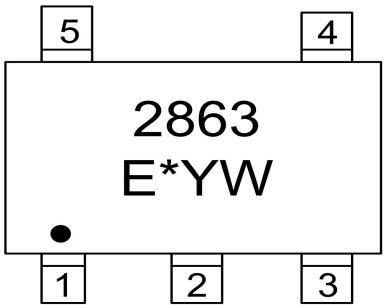
- Cell phones , radiophone, digital cameras
- Bluetooth, wireless handsets
- HiFi products
- Others portable electronics device



SOT-23-5L



Pin Configuration (Top View)



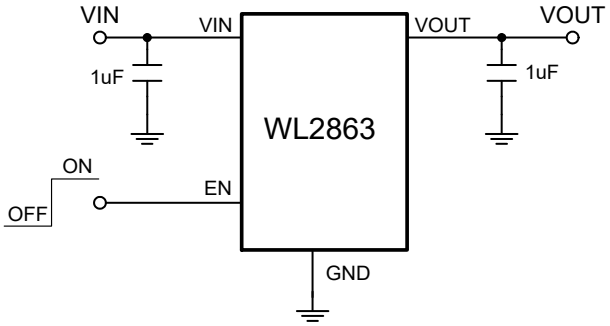
Marking

2863 : Device Code
E : Special Code
*** : Voltage Code**
Y : Year Code
W : Week Code

Order Information

For detail order information, please see page 11

Typical Application

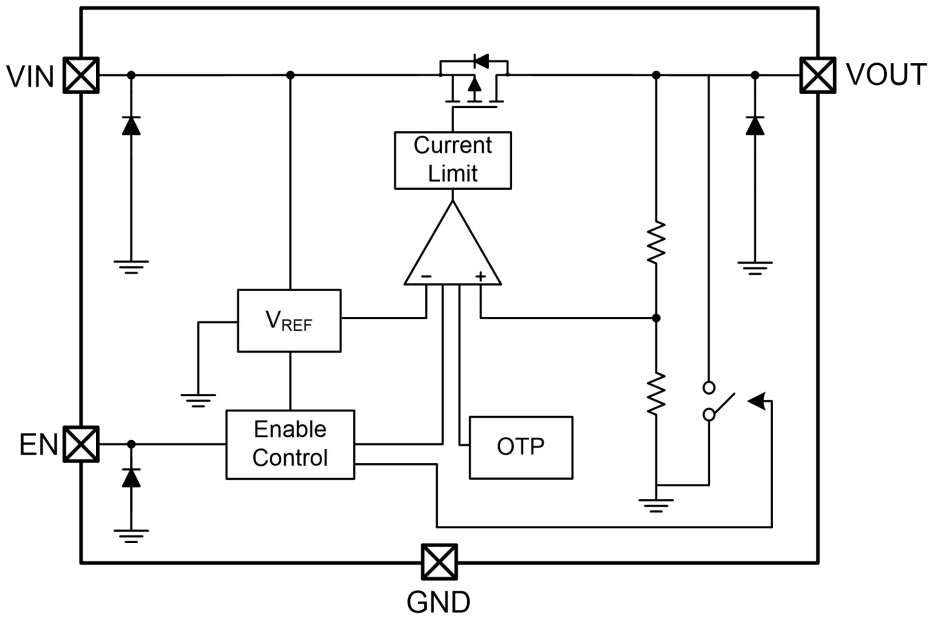


Note : The input and output capacitor must be located a distance of not more than 1 cm

PIN Functions

PIN	Symbol	Description
1	VIN	Input voltage supply pin , 1μF capacitor should be connected at this input
2	GND	Common ground connection
3	EN	Chip enable: Applying VEN < 0.4 V disables the regulator, Pulling VEN > 1.2 V enables the LDO.
4	NC	No internal electrical connection
5	VOUT	Regulated output voltage. 1μF capacitor should be connected at this input

Block Diagram



Absolute Maximum Ratings

Parameter		Value	Unit
Power Dissipation, P_D@T_A=25℃		Internally Limited	mW
V_{IN} Range		-0.3～6.0	V
V_{EN} Range		−0.3 to V_{IN} + 0.3	V
V_{OUT} Range		−0.3 to V_{IN} + 0.3	V
I_{OUT}		250	mA
Lead Temperature Range		260	°C
Moisture Sensitivity Level		Level-3	
Storage Temperature Range		-55 ~ 150	°C
Operating Junction Temperature Range		150	°C
ESD Ratings	HBM	2000	V
	MM	200	V

Recommend Operating Ratings

Parameter	Value	Unit
Operating Input Voltage Range (1)	2.2～5.5	V
Operating Output Voltage Range	1.2～4.3	V
Operating Temperature Range	-40～85	°C
Thermal Resistance, $R_{\theta JA}$	250	°C/W

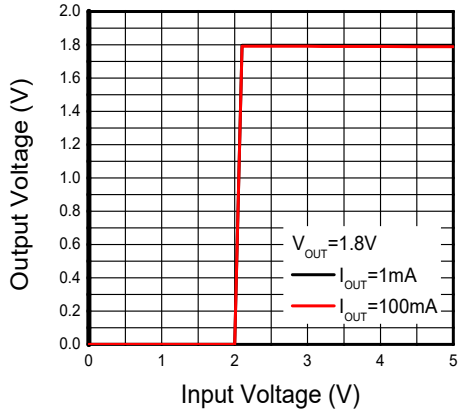
(1) In order to achieve high performance of PSRR, it is recommended that the V_{IN} needs to be no smaller than (V_{OUT}+0.5V).

Electronics Characteristics (V_{IN}=$V_{OUT(NOM)}$+1V, C_{IN}=C_{OUT}=1uF, V_{EN} = 1.2 V. Typical values are at Ta = +25°C ,unless otherwise noted)

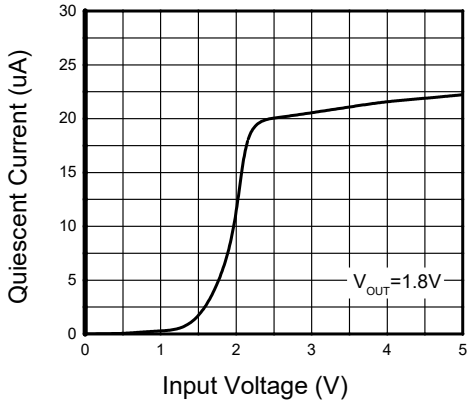
Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Operating Input Voltage	V_{IN}		2.2		5.5	V
Output Voltage Accuracy	V_{OUT}	V_{IN} = $V_{OUT(NOM)}$ + 1 V I_{OUT}=1mA	-2		+2	%
Output Current Limit	I_{LIM}	VOUT = 90% VOUT(NOM)	250			mA
Dropout Voltage		V_{OUT}=2.8$V_{(NOM)}$, I_{OUT}=250mA		115	170	mV
		V_{OUT}=3.0$V_{(NOM)}$, I_{OUT}=250mA		108	162	
		V_{OUT}=3.3$V_{(NOM)}$, I_{OUT}=250mA		102	150	
Line Regulation	$\triangle V_{LINE}$	V_{IN}=2.2V~5V ,I_{OUT}=1mA		0.1		mV
Load Regulation	$\triangle V_{Load}$	I_{OUT}=1~200mA		15		mV
Quiescent Current	I_Q	I_{OUT}=0mA		21	25	μA
Short Current	I_{SHORT}	V_{OUT}=0V		390		mA
Shut-down Current	I_{SHDN}	VEN 0.4 V, VIN = 4.8 V		0.01	1.0	μA
Power Supply Rejection Rate	PSRR	I_{OUT} =10mA, f=100Hz		95		dB
		I_{OUT} =10mA, f=1KHz		100		
		I_{OUT} =10mA, f=100KHz		60		
		I_{OUT} =10mA, f=1MHz		45		
EN logic high voltage	V_{ENH}	V_{IN}=5.5V, I_{OUT}=1mA	1.2			V
EN logic low voltage	V_{ENL}	V_{IN}=5.5V, V_{OUT}=0V			0.4	V
EN Input Current	I_{EN}	V_{EN} = 0 to 5.5V			1	μA
Turn−On Time		C_{OUT} = 1μF, From assertion of VEN to V_{OUT} = 95% V_{OUT} (NOM)		1.5		mS
Output Voltage Noise	e_{NO}	10Hz to 100KHz, I_{OUT} =1mA		7		μVRMS
		10Hz to 100KHz, I_{OUT} =200mA		5		
Thermal shutdown threshold	T_{SDH}	Temperature rising		150		°C
	T_{SDL}	Temperature falling		120		°C
Under voltage lock out threshold	V_{UVLO}			1.9		V
Active Output Discharge Resistance	R_{LOW}	V_{EN}<0.4V		300		Ω
Line Transient	$Tran_{LINE}$	V_{IN} = ($V_{OUT(NOM)}$ + 2 V) to ($V_{OUT(NOM)}$ + 1 V) in 30 us, I_{OUT} = 1 mA	−1			mV
		V_{IN} = ($V_{OUT(NOM)}$ + 1 V) to ($V_{OUT(NOM)}$ + 2 V) in 30 us, I_{OUT} = 1 mA			+1	
Load Transient	$Tran_{LOAD}$	I_{OUT} = 1 mA to 200 mA in 10 us	−10			mV
		I_{OUT} = 200 mA to 1 mA in 10 us			+10	

Typical characteristics (Ta=25 °C, V_{IN}=V_{OUT} +1 V, C_{IN}=C_{OUT}=1uF, unless otherwise noted)

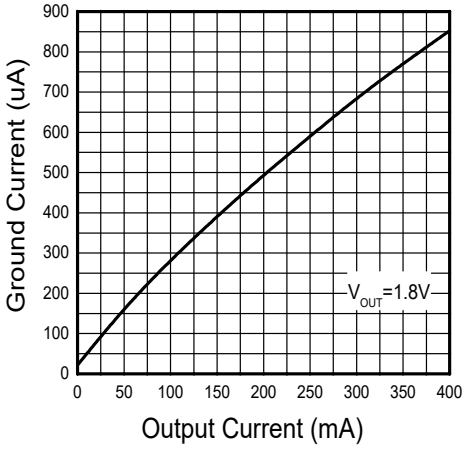
V_{OUT}=1.8V



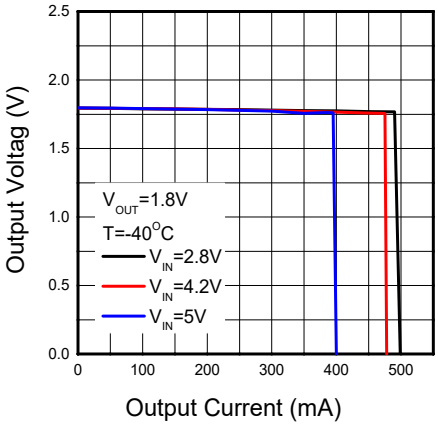
Output voltage vs. Supply voltage



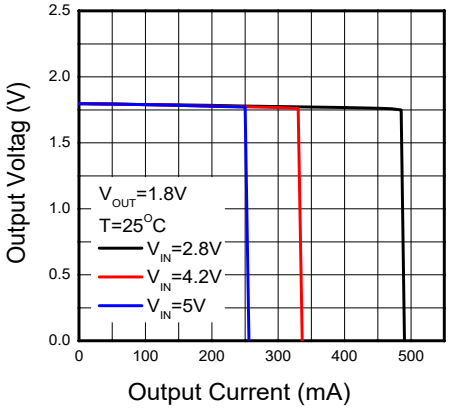
Quiescent current vs. Supply voltage



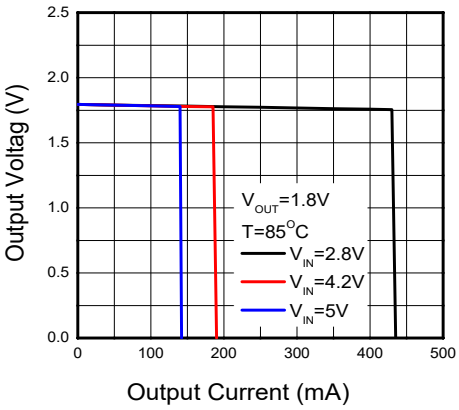
Ground Current vs. Output Current



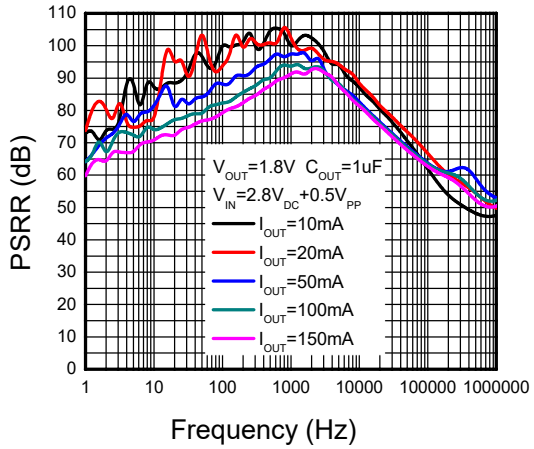
Output voltage vs. Output current



Output voltage vs. Output current

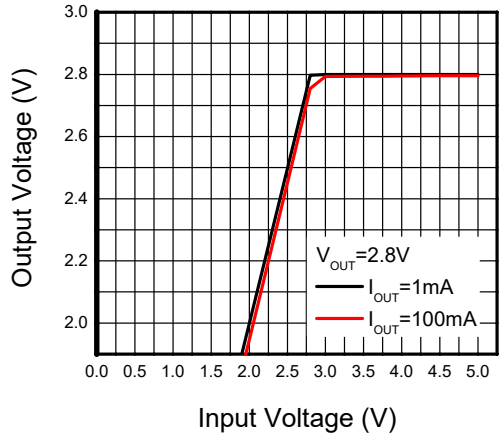


Output voltage vs. Output current

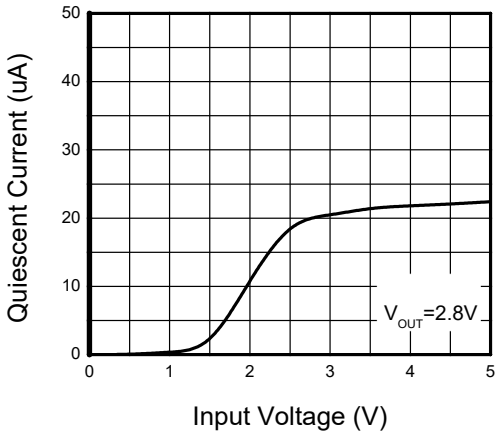


PSRR

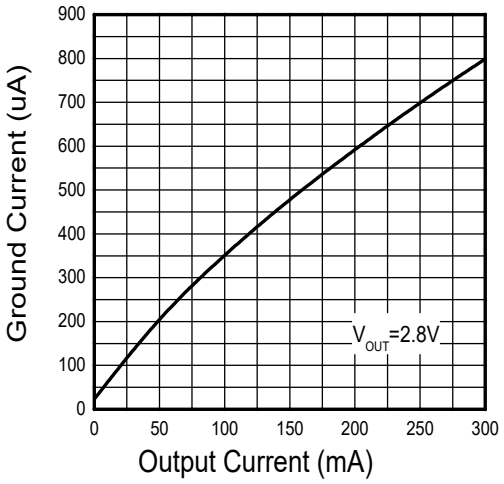
V_{OUT}=2.8V



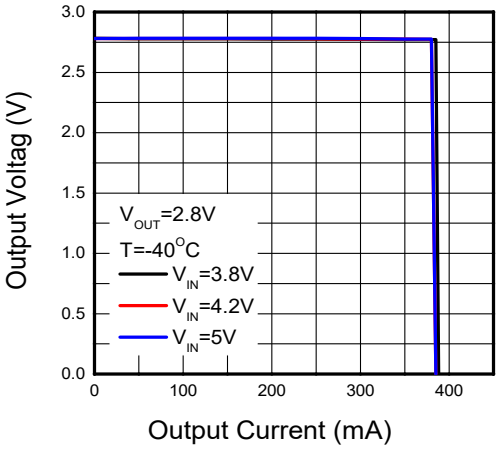
Output voltage vs. Supply voltage



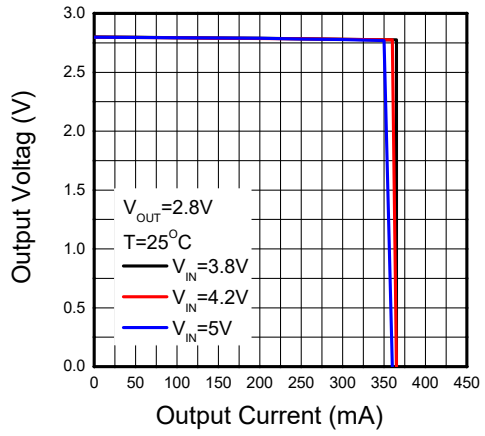
Quiescent current vs. Supply voltage



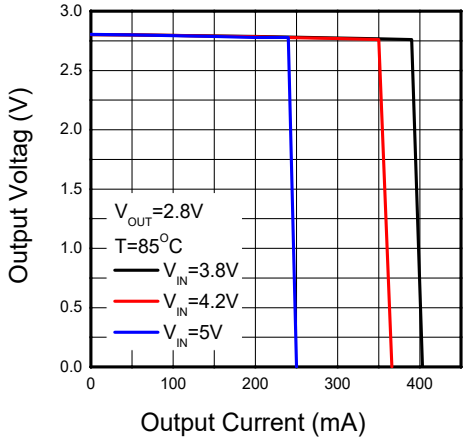
Ground Current vs. Output Current



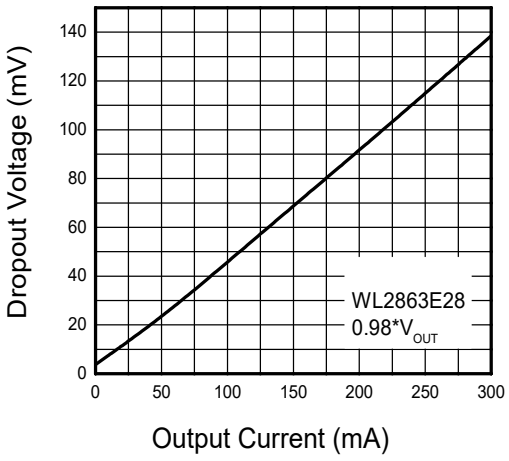
Output voltage vs. Output current



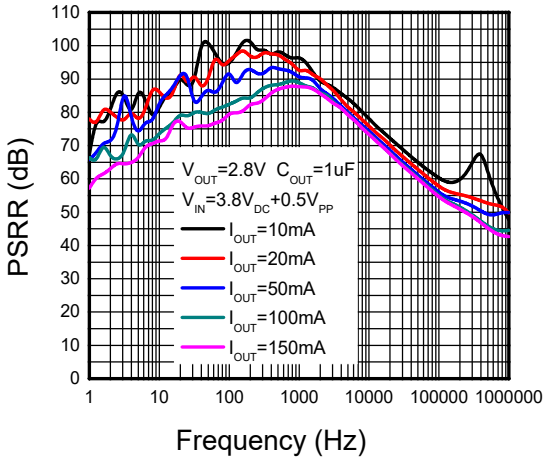
Output voltage vs. Output current



Output voltage vs. Output current

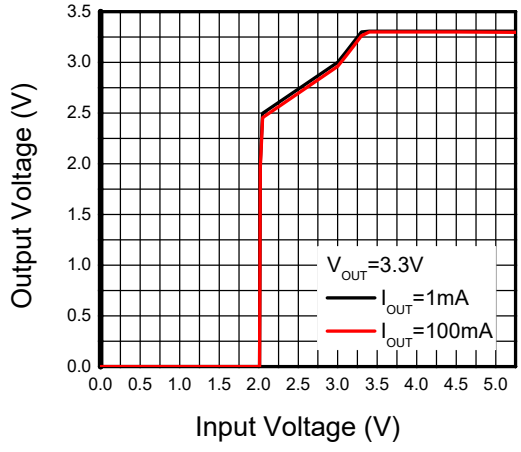


Dropout Voltage vs. Output Current

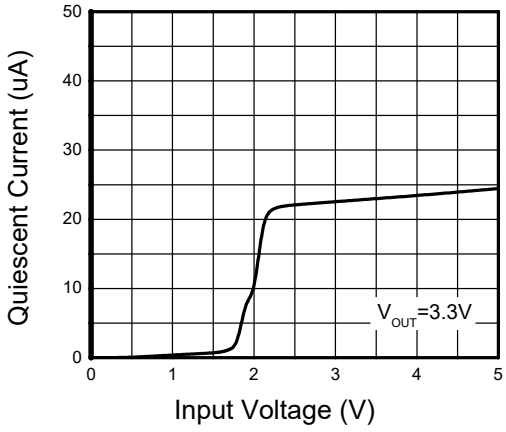


PSRR

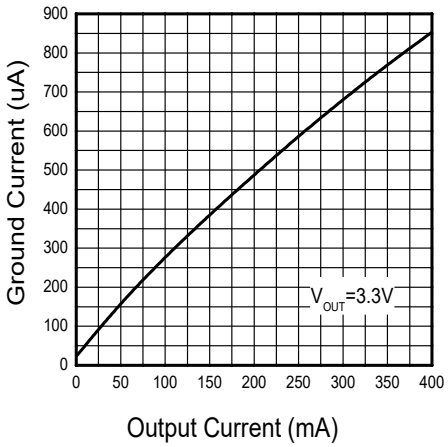
V_{OUT}=3.3V



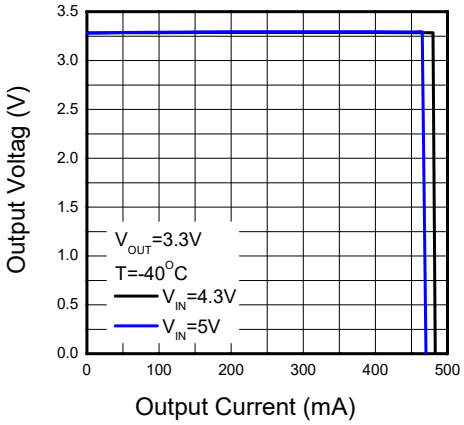
Output voltage vs. Supply voltage



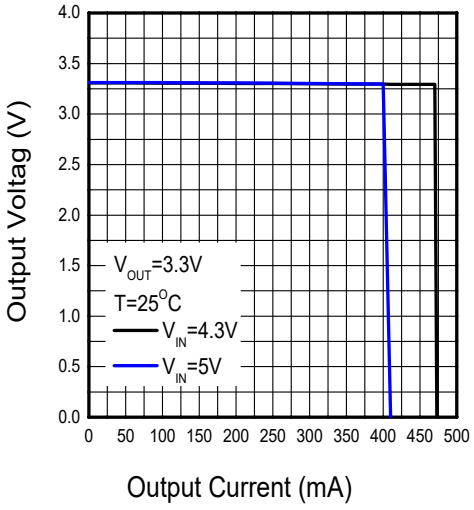
Quiescent current vs. Supply voltage



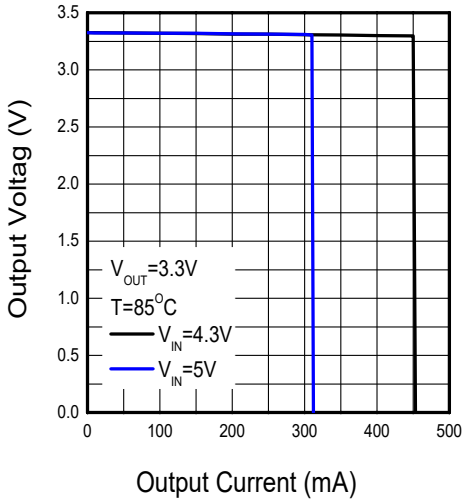
Ground Current vs. Output Current



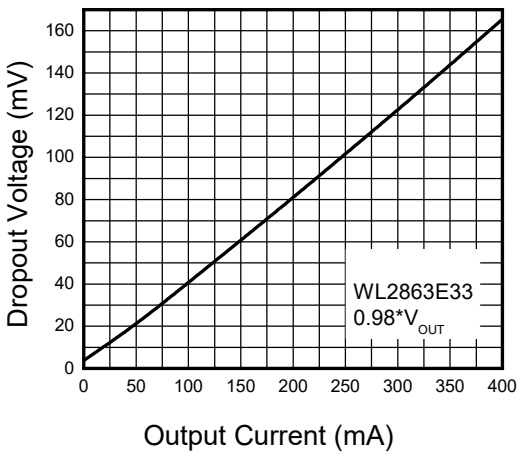
Output voltage vs. Output current



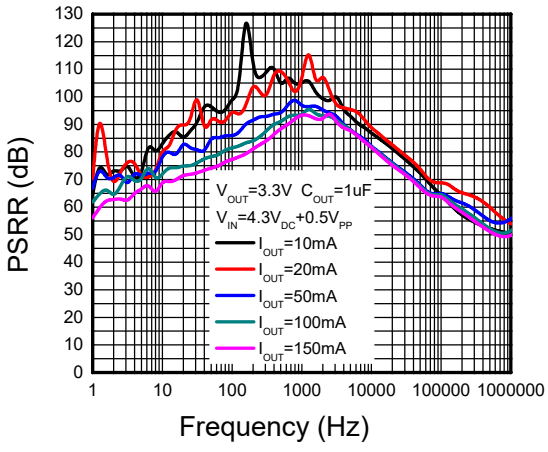
Output voltage vs. Output current



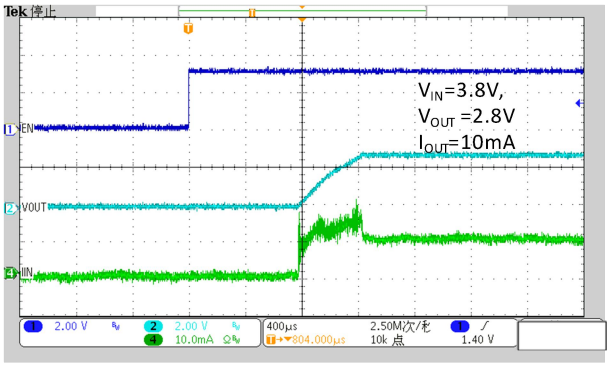
Output voltage vs. Output current



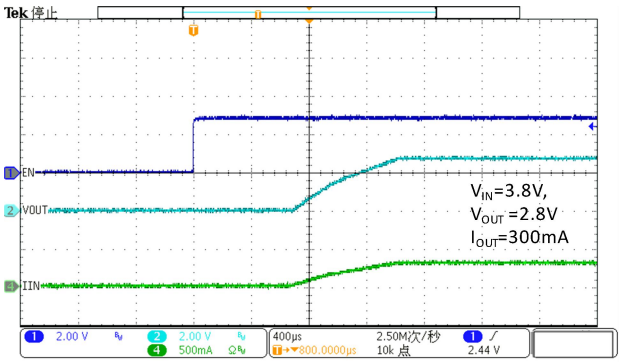
Dropout Voltage vs. Output Current



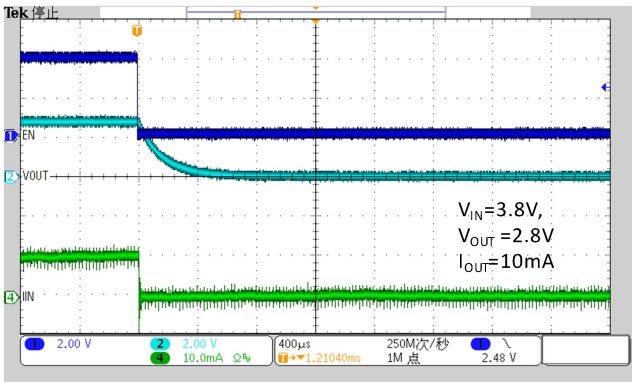
PSRR



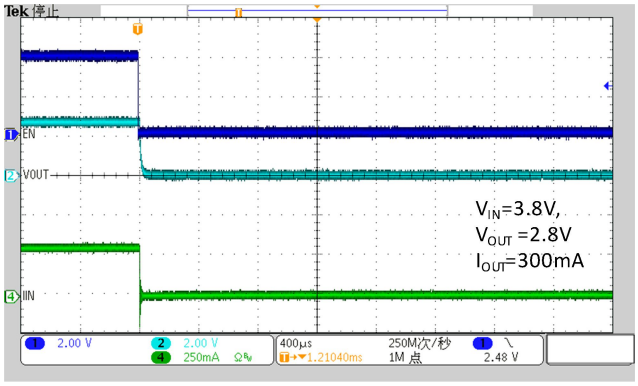
Soft-Start From EN



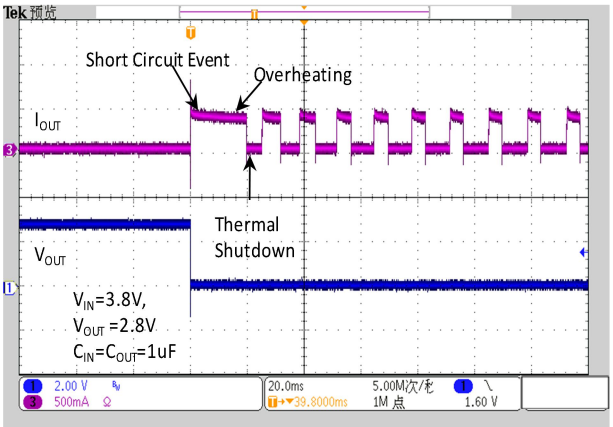
Soft-Start From EN



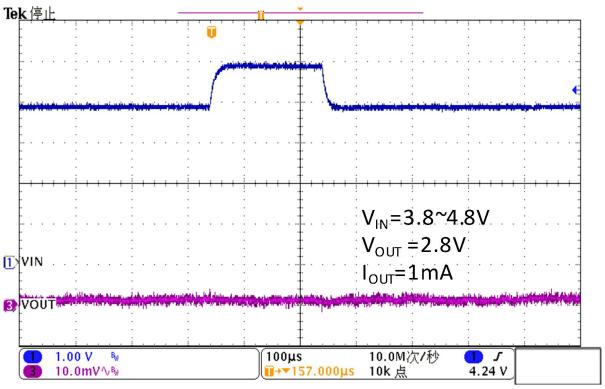
EN Shutdown



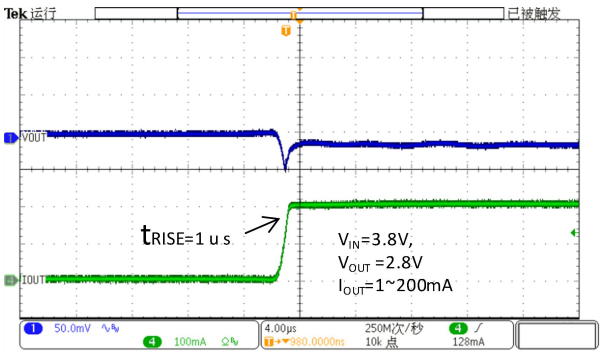
EN Shutdown



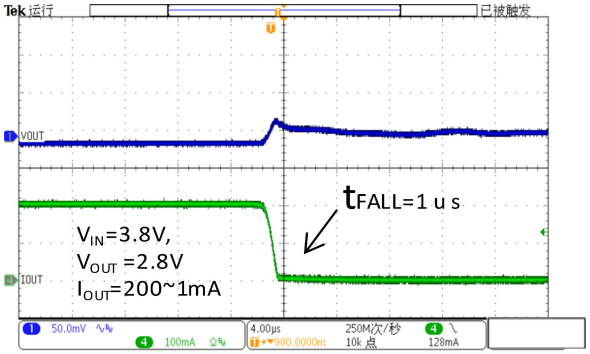
Short Circuit and Thermal Shutdown



Line Transient Response



Load Transient Response



Load Transient Response

ORDER INFORMATION

Ordering No.	Vout (V)	Package	Operating Temperature	Marking	Shipping
WL2863E12-5/TR	1.2	SOT-23-5L	-40~+85°C	2863 EEYW	Tape and Reel, 3000
WL2863E15-5/TR	1.5	SOT-23-5L	-40~+85°C	2863 EGYW	Tape and Reel, 3000
WL2863E18-5/TR	1.8	SOT-23-5L	-40~+85°C	2863 EHYW	Tape and Reel, 3000
WL2863E25-5/TR	2.5	SOT-23-5L	-40~+85°C	2863 EKYW	Tape and Reel, 3000
WL2863E28-5/TR	2.8	SOT-23-5L	-40~+85°C	2863 ELYW	Tape and Reel, 3000
WL2863E29-5/TR	2.9	SOT-23-5L	-40~+85°C	2863 EgYW	Tape and Reel, 3000
WL2863E30-5/TR	3.0	SOT-23-5L	-40~+85°C	2863 EMYW	Tape and Reel, 3000
WL2863E33-5/TR	3.3	SOT-23-5L	-40~+85°C	2863 ENYW	Tape and Reel, 3000

Marking

2863 : Device Code

E : Special Code

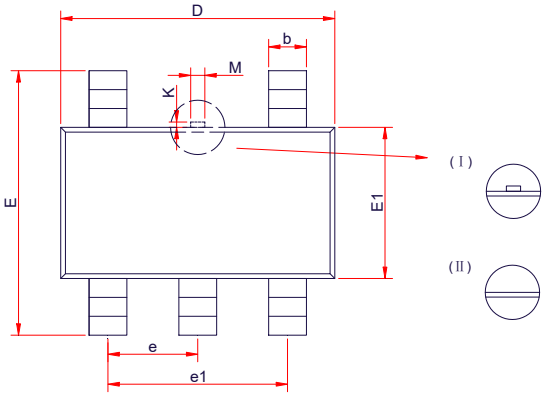
*** : Voltage Code**

Y : Year Code

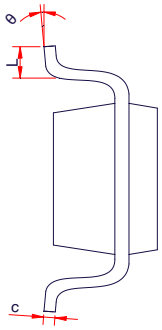
W : Week Code

PACKAGE OUTLINE DIMENSIONS

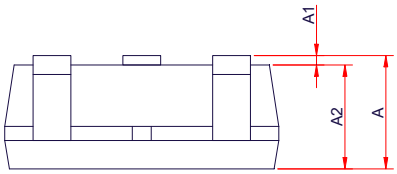
SOT-23-5L



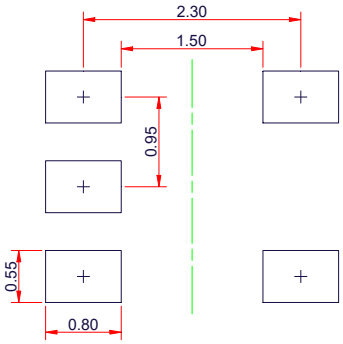
TOP VIEW



SIDE VIEW



SIDE VIEW

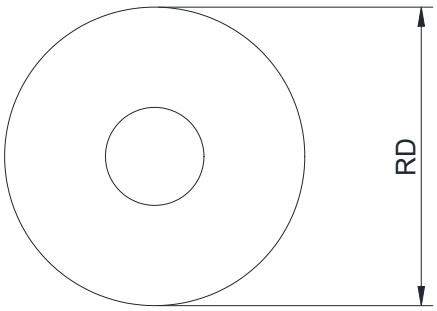


RECOMMENDED LAND PATTERN (unit: mm)

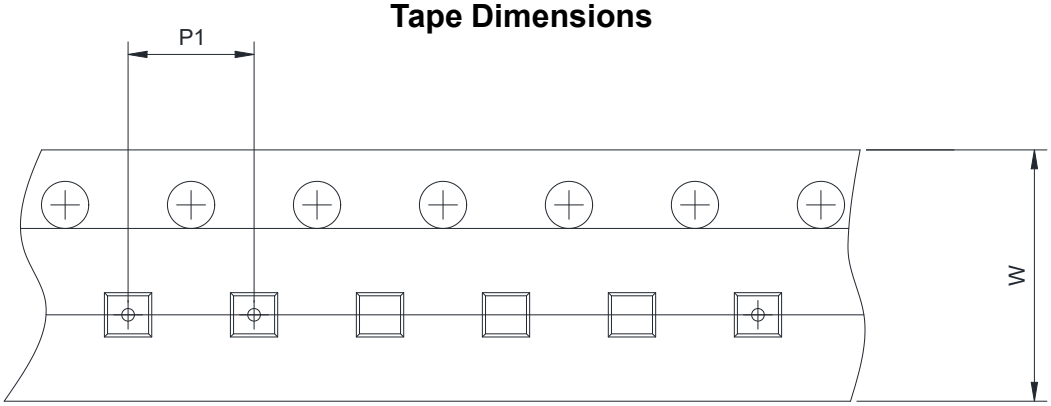
Symbol	Dimensions in Millimeters		
	Min.	Typ.	Max.
A	-	-	1.25
A1	0.00	-	0.15
A2	1.00	1.10	1.20
b	0.30	0.40	0.50
c	0.10	-	0.21
D	2.72	2.92	3.12
E	2.60	2.80	3.00
E1	1.40	1.60	1.80
e	0.95 BSC		
e1	1.90 BSC		
L	0.30	0.45	0.60
M	0.10	0.15	0.25
K	0.00	-	0.25
θ	0°	-	8°

TAPE AND REEL INFORMATION

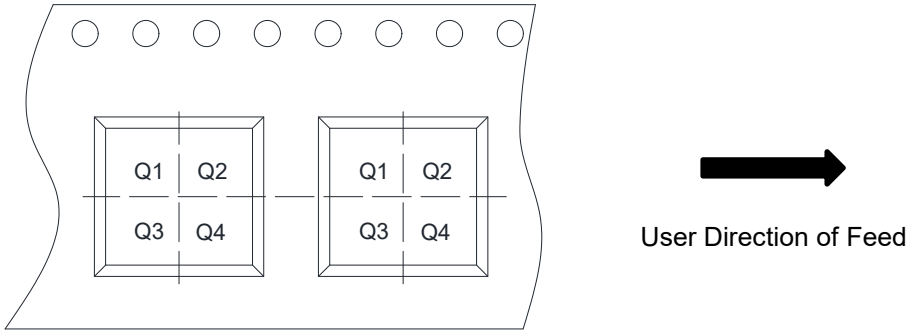
Reel Dimensions



Tape Dimensions



Quadrant Assignments For PIN1 Orientation In Tape



RD	Reel Dimension	☑ 7inch	☐ 13inch		
W	Overall width of the carrier tape	☑ 8mm	☐ 12mm	☐ 16mm	
P1	Pitch between successive cavity centers	☐ 2mm	☑ 4mm	☐ 8mm	
Pin1	Pin1 Quadrant	☐ Q1	☐ Q2	☑ Q3	☐ Q4